

EXHIBIT 2

chapter 9

Skeletal System (Skull; Limbs; Vertebral Column)

The skeletal system develops from the mesodermal germ layer, which appears during the third week of development. It forms a series of mesodermal tissue blocks, the somites, on each side of the neural tube (fig. 9-1A). Soon after its formation each somite becomes differentiated in a ventromedial part, the sclerotome, and a dorsolateral part, the dermomyotome. At the end of the fourth week the sclerotome cells become polymorphous and form a loosely woven tissue known as mesenchyme or embryonic connective tissue (fig. 9-1B). It is characteristic for the mesenchymal cells to migrate and to differentiate in many different ways. They may become fibroblasts, chondroblasts, or osteoblasts, the bone forming cells.

The bone forming capacity of mesenchyme is not restricted to the cells of the sclerotome, but occurs also in the somatic mesoderm layer of the body wall where the ribs are formed. More recently it has been shown that neural crest cells in the head region also differentiate into mesenchyme and participate in the formation of bones of the face.¹ In some bones, such as the flat

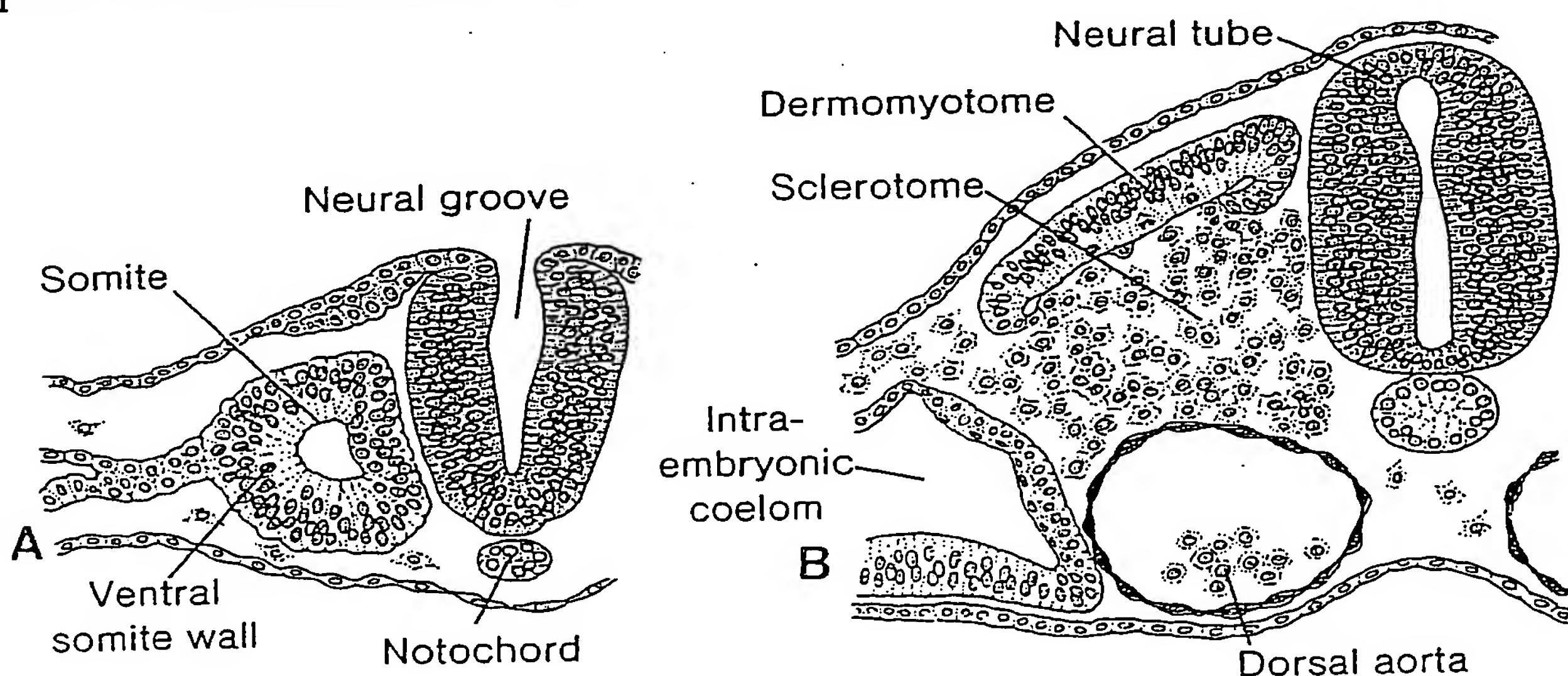


Figure 9-1. Development of the somite. A, The mesoderm has formed a somite and the cells are arranged around a small cavity. B, As a result of further differentiation the cells in the ventromedial wall lose their epithelial arrangement and become mesenchymal. They are collectively referred to as the sclerotome. The cells in the dorsolateral wall of the somite form the dermomyotome.